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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/636,484	08/10/2000	Walter David Braddock IV	DB3	6691

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NEIFELD IP LAW, PC  
CRYSTAL PLAZA 1, SUITE 1001  
2001 JEFFERSON DAVIS HIGHWAY  
ARLINGTON, VA 22202

EXAMINER

KANG, DONGHEE

ART UNIT PAPER NUMBER

2811

DATE MAILED: 07/15/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/636,484

Applicant(s)

WALTER DAVID BRADDOCK

Examiner

Donghee Kang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 April 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 and 36-55 is/are pending in the application.
- 4a) Of the above claim(s) 53-55 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-26, 37 and 39-52 is/are allowed.
- 6) ☒ Claim(s) 36 and 38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All   b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Acknowledgment***

1. Applicant's Amendment and Response to Paper No.2 has been entered and made of record. Claims 27-35 have been cancelled and new claims 38-55 are added. Thus claims 1-26 and 36-55 are pending in this application.

### ***Information Disclosure Statement***

2. Acknowledgment is made of receipt of applicant's Information Disclosure Statement (PTO-1449) filed March 21, 2002.

### ***Election/Restrictions***

3. Newly submitted claims 53-55 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

I. Claims 1-26 & 36-52, drawn to a semiconductor device, classified in class 257, subclass 392.

II. Claims 53-55, drawn to a process of making a semiconductor device, classified in class 438, subclass 216.

The inventions are distinct, each from the other because of the following reasons: Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case unpatentability of the group II invention would not necessarily imply unpatentability of the method of the group I invention, since the device

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of the group II invention could be made by process different from those of the group I invention. In the instant case, the device may be formed by a reverse order such as that forming a gate electrode on temporary substrate, forming a second layer on the gate electrode, forming a semiconductor wafer on the second layer, and then removing the temporary substrate.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 53-55 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

#### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim **38** is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification does not support the limitation "said transistor is integrated together with similar and complementary transistor devices to form complementary metal-oxide-compound semiconductor integrated circuit."

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims **36 & 38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Passlack et al. (US 5,945,718).

Regarding claim **36**, Passlack teaches an enhancement mode metal-oxide-compound semiconductor field effect transistor comprising (Fig.1):

a compound semiconductor wafer structure (12) having an upper surface; a gate insulator structure (14) positioned on upper surface of said compound semiconductor wafer structure; a gate electrode (17) positioned on upper surface of said gate insulator structure layer; source (21) and drain (22) ion implants self-aligned to the gate electrode; and source and drain ohmic contacts (19 & 20) positioned on ion implanted source and drain areas, wherein said compound semiconductor wafer structure comprises a AlGaAs (23) and InGaAs (24) layers positioned on said upper surface; and a substrate (11) on which resides said compound semiconductor wafer structure. See also Col.2, line 65 – Col.4, line 4.

Passlack teaches the substrate includes comprises a GaAs but not InP.

However, it is well known in the art and conventional to use the InP material as a substrate material (page 2, lines 16-18 in specification). Thus it would have been obvious in the art at the time the invention was made to substitute the GaAs of Passlack with well known InP since GaAs and InP both exhibit faster and more optimized speed/power performance.

Regarding claim **38**, Passlack teaches an enhancement mode metal-oxide-compound semiconductor field effect transistor comprising (Fig.1):

a compound semiconductor wafer structure (12) having an upper surface; a gate insulator structure (14) positioned on said upper surface; a gate electrode (17) positioned on upper surface of said gate insulator structure layer; source (21) and drain (22) ion implants self-aligned to the gate electrode; and source and drain ohmic contacts (19 & 20) positioned on ion implanted source and drain areas, wherein the compound semiconductor wafer structure comprises a wider band gap spacer layer (23) and a narrower band gap channel layer (InGaAs, 24). See also Col.2, line 65 – Col.4, line 4.

Passlack does not show in Fig.1 the transistor is integrated together with similar and complementary transistor device to form complementary metal-oxide compound semiconductor integrated circuit. However, it is noted in the art that complementary GaAs exhibits optimum speed/power performance and efficiency at a low supply voltage of 1 V and below (see Col.1, lines 22-24). Thus, it would have been obvious in the art at

the time the invention was made to form CMOS device in order to provide high speed/power with lower power supply.

***Allowable Subject Matter***

8. Claims 1-26 & 39-52 are allowed.

9. The following is an examiner's statement of reasons for allowance:

Passlack teaches metal oxide field effect transistor comprising  $\text{Ga}_2\text{O}_3$  gate oxide layer but not teach additional gate oxide layer formed on  $\text{Ga}_2\text{O}_3$  layer, wherein the additional gate oxide layer comprises gallium, oxygen, and at least one rare earth element. In the present claimed invention, the transistor enables stable and reliable device operation, provide optimum efficiency and output power for RF and microwave applications as well as for digital integrated circuits that require very high integration densities.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Response to Arguments***

10. Applicant's arguments filed on April 24, 2002 have been fully considered but they are not persuasive.

Applicant amended claim 36 and added new claim 38 to overcome the rejection. However, Passlack clearly teaches amended claim 36 and new claim 38. See a statement of rejections of 36 & 38.

***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.



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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Donghee Kang, Ph.D.  
July 1, 2002

Steven Loke  
Primary Examiner

A handwritten signature in cursive script that reads "Steven Loke".